

CLAIMS

1. A low alloy steel, characterized by consisting of, by mass %, C:0.2- 0.55%, Si:0.05-0.5%, Mn:0.1-1%, S:0.0005-0.01%,
5 O(Oxygen):0.0010-0.01%, Al:0.005-0.05%, Ca:0.0003-0.007%, Ti:0.005-0.05%, Cr:0.1-1.5%, Mo:0.1-1% and Nb:0.005-0.1%, and the balance Fe and impurities; and also characterized by the impurities whose contents are restricted to $P \leq 0.03\%$ and $N \leq 0.015\%$; and further characterized by containing composites of inclusions of not
10 greater than $7\mu\text{m}$ in major axis with an appearance frequency of not less than 10 pieces of composites per 0.1mm^2 of the steel cross section, wherein the composite comprises an outer shell of carbonitride of Ti and/or Nb surrounding a nucleus of oxysulfide of Al and Ca.
2. A low alloy steel, characterized by consisting of, by mass %, C:0.2-0.55%, Si:0.05-0.5%, Mn:0.1-1%, S:0.0005-0.01%,
15 O(Oxygen):0.0010-0.01%, Al:0.005-0.05%, Ca:0.0003-0.007%, Ti:0.005-0.05%, Cr:0.1-1.5%, Mo:0.1-1% and Nb:0.005-0.1%, and at least one alloying element selected from V:0.03-0.5%, B:0.0001-0.005% and Zr:0.005-0.10%, and the balance Fe and
20 impurities; and also characterized by the impurities whose contents are restricted to $P \leq 0.03\%$ and $N \leq 0.015\%$; and further characterized by containing composites of inclusions of not greater than $7\mu\text{m}$ in major axis with an appearance frequency of not less than 10 pieces of composites per 0.1mm^2 of the steel cross section, wherein the
25 composite comprises an outer shell of carbonitride of Ti, Nb and/or Zr surrounding a nucleus of oxysulfide of Al and Ca.

3. A low alloy steel according to either Claim 1 or 2, characterized by an S content of 0.0010-0.01%.

4. A method of manufacturing a low alloy steel that contains
5 composites of inclusions of not greater than $7\mu\text{m}$ in major axis with an appearance frequency of not less than 10 pieces of composites per 0.1mm^2 of the steel cross section, wherein the composite comprises an outer shell of carbonitride of Ti and/or Nb surrounding a nucleus of oxysulfide of Al and Ca according to either Claim 1 or 3, characterized
10 by cooling the steel at a rate of not more than $500^\circ\text{C}/\text{min}$ from 1500°C to 100°C during the casting of the steel.

5. A method of manufacturing a low alloy steel that contains composites of inclusions of not greater than $7\mu\text{m}$ in major axis with
15 appearance frequency of not less than 10 pieces of composites per 0.1mm^2 of the steel cross section, wherein the composite comprises an outer shell of carbonitride of Ti, Nb and/or Zr surrounding a nucleus of oxysulfide of Al and Ca according to either Claims 2 or 3, characterized by cooling the steel at a rate of not more than
20 $500^\circ\text{C}/\text{min}$ from 1500°C to 1000°C during the casting of the steel.